REMARKS

Advisory Action

The Advisory Action maintains the rejections and states that Vermeersch et al. (EP 770,494 and US 5,786,128) teach that the image layer may be developed with a dampening liquid "and/or ink". Further, the Advisory Action states that Teng (US 6,482,571) teaches that an image layer typically developed with the dampening liquid and/or ink can be developed with "single-fluid ink".

Examiner Interview

Applicants wish to thank Examiner Stephen Funk for the courtesies extended to Xavier Pillai, one of applicants' attorneys, during the telephone interview held on March 31, 2004, to discuss the Advisory Action.

Present Invention

Claims 1, 2, and 6-27 are currently pending. Applicants have found a unique method of lithographic printing, employing single-fluid ink containing an emulsion of a hydrophobic ink phase and a non-aqueous polar phase, which produces unexpected and surprising results.

Discussion

Applicants respectfully traverse the rejections. Applicants also incorporate by reference the response filed on December 17, 2003.

Applicants wish to clarify the meaning of the term "ink" in the cited documents, Vermeersch et al. '494 and '128. As set forth at paragraph 4 of the Declaration, the term "ink" mentioned in Vermeersch et al. '494 or '128 (and in Held, U.S. Patent 4,147,549) refers to conventional lithographic ink. Lithography is based on the immiscibility of water and ink, more precisely on the immiscibility of the aqueous dampening liquid and oily (or greasy) ink. It is a fundamental requirement that litho ink is oil-based so that it separates from water. During lithographic printing, both the aqueous dampening liquid and the oily ink are supplied to the plate. On the plate, the water separates from the ink, adheres to the hydrophilic (non-printing) areas of the plate and thereby renders these areas ink repelling. If no water would be supplied during lithographic printing, the ink would wet the whole plate and a completely black print would be obtained. In other words, when the term "ink" is used in cited documents relating to lithographic printing, it is more than clear for the skilled person that a

greasy, water immiscible ink is referred to. The enclosed publication (Exhibit A to the Declaration) at pages 4.6-4.7 illustrates this general common knowledge.

Single-fluid ink, on the other hand, is an emulsion of an ink phase and a non-aqueous polar phase (see page 15, lines 15 – 17 of the application), and is thus not at all related to the conventional oily, greasy inks disclosed in the cited. The polar phase acts as a wetting agent and wets the non-printing areas, thereby preventing adsorption of the ink phase on these non-printing areas. Contrary to conventional printing with conventional greasy inks, there is no need to supply water during printing with single-fluid ink. There is, in other words, no genus-species relationship between the terms "ink" and "single-fluid ink", and it is unmistakably clear to the skilled person that "single-fluid ink" is an emulsion of an ink phase. The enclosed Declaration, at paragraphs 5-6, demonstrates that the plates of Vermeersch et al. '494 require <u>both</u> ink (conventional, greasy ink) <u>and</u> fountain solution as the developer solution. The comparative examples clearly demonstrate that ink alone (without fountain) is not sufficient to develop the plate precursors.

Applicants respectfully submit that the combination of Vermeersch et al. '494 (or '128) and Teng to reject the present claims is erroneous because (1) the cited references fail to suggest or motivate those of ordinary skill in the art to use a nonaqueous phase rather than an aqueous fountain solution; (2) less than a reasonable expectation of success exists in arriving at the presently claimed invention; and (3) the presently claimed method produces unexpectedly surprising results, as discussed below.

Vermeersch et al. '494 requires that the plate must be treated with an aqueous fountain solution (see, e.g., column 8, lines 46-53). Teng also teaches that an aqueous fountain solution is used (see, e.g., column 8, lines 42-67, especially lines 47 ("mainly water") and 60 ("primarily water"). Combining Vermeersch et al. '494, which teaches the use of an aqueous fountain solution, with Teng, which also teaches the use of an aqueous fountain solution, cannot and does not suggest to those of ordinary skill in the art a method where a nonaqueous phase is used. Teng does not describe that a nonaqueous phase can be used. Teng merely makes a passing remark that single-fluid ink can be used. This passing remark does not carry, and should not be given, much weight when the entire disclosure of Teng is considered. It is established law that when analyzing obviousness or lack thereof, the teaching of the entire disclosure of a reference or references must be considered, not selected

or isolated portions. Thus, taking the totality of the disclosures of Vermeersch et al. '494 and Teng, in an objective manner, there is simply no suggestion to those of ordinary skill in the art to provide a nonaqueous phase in place of the aqueous fountain solution.

Even assuming *arguendo* that Teng adequately teaches the use of single-fluid ink, the expectation of success in combining the teachings of Vermeersch et al. '494 and Teng to arrive at the presently claimed invention is less than reasonable in view of the differences that exist in the working mechanisms of the printing plate precursors of Vermeersch et al. '494 and of the printing plate precursors of Teng, as set forth at paragraph 7 of the Declaration.

In the plates of Vermeersch et al. '494, the imaged parts become insoluble by heat-induced coagulation. Coagulation may result from heat-induced coalescence, softening or melting of the thermoplastic polymer particles. The developer solution, i.e., ink and fountain solution, removes the non-imaged parts without solubilizing and/or damaging the imaged parts. If one were to replace this aqueous ink developer solution (in two parts) by the single-fluid ink, the single-fluid ink should not only be capable of removing the non-image parts, but also <u>the imaged parts should be resistant</u>, i.e., insoluble, towards the single-fluid ink. However, starting from the teaching of Teng, there is no indication that both these requirements would be fulfilled for the plates of Vermeersch et al., at least for the following two reasons.

First, Teng teaches insolubilization of the imaged parts through polymerization or cross-linking of two resins (monomers, oligomers or polymers): chemical covalent bonds are formed resulting in insolubility towards the single-fluid ink. In the plates of Vermeersch et al., '494, the exposed parts become insoluble towards ink and fountain only by heat-induced coalescence, softening or melting of the thermoplastic polymer particles, i.e., without the formation of covalent bonds. It is, in other words, not at all evident that the imaged parts of such plates which are resistant towards "conventional" ink and/or fountain solution, are also resistant to single-fluid inks which comprise a polar phase instead of an aqueous phase.

Second, the ingredients, which should be removable when not exposed, used in the plates of Teng are totally different than the ingredients used in the plates based on latex coalescence of Vermeersch et al. For example, the hydrophobic polymers in the plates of Vermeersch et al. '494 are necessarily present in particle form while the hydrophobic polymers in the plates of Teng are "binders" (see column 6, lines 49-59), i.e., they form a

film matrix immediately after coating (the particles of Vermeersch et al. form a matrix upon image-wise exposure). It is therefore not evident that the non-imaged parts of Vermeersch et al. are removable by using single-fluid ink instead of ink and fountain.

The foregoing shows that the utilization of single-fluid ink instead of ink/fountain solution as developer should not only ensure the complete removal of the non-image parts, but should also ensure that the imaged parts remain unaffected. Both these process requirements are not derivable from Teng because there is no such indication in Teng (or expectation of success) that single-fluid ink would work for other plates than the plate of his invention. See column 9, lines 55-57: "The recently introduced single-fluid ink by Flint Ink Company, which can be used for printing wet lithographic plate without the use of fountain solution, can also be used for the on-press development and printing of the plate of this invention."(Emphasis added).

The plates of Vermeersch et al. '128 based on aryldiazo sulfonate polymer do not involve heat-induced coagulation of a polymer latex. The aryldiazo sulfonate polymer is present as a film-forming binder, not as a dispersed latex particle. The imaging mechanism of such a coating relies on heat- or light-induced insolubilization. The imaged parts become insoluble by photolysis of the water-solubilizing aryldiazo sulfonate group: i.e. the diazo bond of the aryldiazo sulfonate polymer readily decomposes with release of nitrogen, thereby splitting off the sulfonate group and rendering the polymer insoluble. So, the plates of Vermeersch '128 (and Vermeersch '494) can both be distinguished from Teng because in both cases there is no formation of covalent bonds and as a result, it is not evident that the imaged parts of these plates which, according to the prior art, are resistant towards 'conventional' ink and/or fountain solution, are also resistant to single fluid inks which comprise a polar phase instead of an aqueous phase.

The coating solution of the plates of Vermeersch '128 comprises aryldiazo sulfonate polymer dissolved in demineralized water; it would therefore be obvious to the skilled person that the non-imaged parts of such plates are removable with (an aqueous) fountain solution. However, single-fluid ink does not contain water. The ingredients which should be removable when not exposed are also for Vermeersch '128 totally different than the ingredients used in the plates of Teng and therefore, there is no indication starting from Teng

that the non-exposed ingredients of Vermeersch '128 would be removable in single fluid ink as single fluid ink comprises no aqueous phase.

In conclusion, Vermeersch et al. '494 teaches plates based on latex coalescence which are processed with ink and fountain, Vermeersch et al. '128 teaches plates based on aryldiazosulfonate polymer, and Teng teaches plates based on polymerization or crosslinking which are processable with single-fluid ink. The combination of the two documents as well as Moss et al. EP 640 478) to arrive at the presently claimed invention can only be done by improper hindsight. Applicants respectfully submit that the specific combination of the features of the present claims 1, 2, and 6-8, 11, and 12, i.e., plates comprising latex particles combined with development with single-fluid ink, is not obvious and that the rejection of the claims does not comply with the M.P.E.P. requirement (Section 706.02(j)) which requires that cited documents should teach or suggest to make the claimed combination with reasonable expectation of success to justify an obviousness rejection. In the cited art, no hint to the claimed combination can be found. The combination of Vermeersch et al.'128 (i.e., photolysis of aryldiazosulfonates) and Teng (and Moss et al.) is not justified and the rejection of present claims 16-20, 23, and 24 is erroneous.

The foregoing shows that a *prima facie* case for obviousness cannot be made. Nevertheless, the presently claimed invention is patentable over the cited references because the presently claimed invention is surprising and unexpected. As discussed, the Declaration shows that the ink alone is insufficient to develop the image. As the use of fountain solution without ink is not sufficient, it should be concluded that <u>both</u> fountain **<u>and</u>** ink are required for the plates of Vermeersch et al. Since single-fluid ink does not contain an aqueous phase but is an emulsion of an ink phase and a non-aqueous polar phase, and since an aqueous phase is an essential part of a suitable developer solution, it is surprising that single-fluid ink which contains no aqueous phase works as developing solution. The skilled person, who starts from the teaching of Vermeersch et al., would know that ink alone is not sufficient as developer solution but that an aqueous liquid must be added to the ink in order to obtain good developing results. Therefore, it is unexpected and inventive that single-fluid <u>ink</u>, which contains no aqueous phase, is an efficient developer solution.

The experiments summarized in the Declaration were not carried out in exactly the same circumstances as the experiments carried out in the present application because the press used in the application is a Quickmaster DI 46-4 (Heidelberger Druckmaschinen, Germany), which is a driographic digital press. In such presses, processing of plate materials by fountain is not possible since only ink can be supplied to the plate. As applicants' goal here is to demonstrate that a fountain solution is necessary for developing the plates of the cited, applicants used a press with this facility, i.e., a wet offset printing press. In the comparative examples, a Heidelberg GT052 printing press equipped with a Dahlgren integrated ink supply/dampening system was therefore used. In addition, the Quickmaster DI requires PET-based plates, which can be wound and unwound on the supply and uptake spool inside the cylinder of the press, whereas the GT052 press requires an aluminum support. Furthermore, the experiments were carried out using a readily available latex (a polystyrene/acrylonitrile copolymer) instead of a polystyrene latex used in the present application; the use of such a copolymer latex is disclosed at page 9, lines 26-29 of the application. The other ingredients of the coating applied are similar: i.e., polyacrylic acid (15%wt) and IR dye (10%wt) cfr. IR-1 on page 31, lines 19-20 of the application. Finally, the single-fluid ink used in the present application was prepared in-house while the single-fluid ink used in the comparative examples of the Declaration was provided by Flint Ink Corporation.

The results show that on-press processing of the material as defined in the claims of the presently claimed invention with ink and fountain is equally good as on-press processing with single-fluid ink. However, materials which require both ink and fountain for processing, cannot be used on driographic presses as such presses do not comprise a fountain supply. Also, the optimization of on-press processing of such materials on conventional wet-offset printing presses that comprise an integrated ink/fountain supply is critical because fountain and ink have to be supplied simultaneous. These two major problems, which are identified in the application on page 4, lines 5-21, are solved by the presently claimed invention by using single-fluid ink instead of ink and fountain as developer solution, on-press processing in driographic presses or in conventional wet-offset printing presses that comprise an integrated ink/fountain supply of the material as defined in the present claims becomes feasible.

In view of the foregoing, applicants respectfully submit that the present claims are patentable over the cited references.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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